

Appln. No. 09/857,310
Amdt. dated December 10, 2003
Reply to Office Action dated Oct. 27, 2003

AMENDMENTS TO THE CLAIMS:

Please cancel claims 10, 11, 12, 18, 27 and 28 and amend claims 1, 3 and 19-23. The following listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently Amended) A method of forming a magnetic resonance image of an object to be examined, comprising the steps of:

inserting a microcoil into the object being examined,
acquiring a reference magnetic resonance signals at a
reference temperature after the microcoil is inserted into the
object being examined,
~~inserting a microcoil into the object being examined,~~
~~after the magnetic resonance signals at the reference~~
~~temperature are obtained, increasing the temperature in an area~~
~~proximate the microcoil and acquiring measuring magnetic~~
~~resonance signals after the temperature in the area proximate the~~
~~microcoil has been increased,~~
determining the position of the microcoil,

Appln. No. 09/857,310
Amdt. dated December 10, 2003
Reply to Office Action dated Oct. 27, 2003

determining a geometrical relationship between the position of the microcoil and the object being examined,

reconstructing the magnetic resonance image from the acquired magnetic resonance signals and on the basis of the determined position of the microcoil, the reconstruction step including reconstructing a reference magnetic resonance image from the reference magnetic resonance signals and reconstructing a measuring magnetic resonance image from the measuring magnetic resonance signals,

reproducing a detail of the object being examined and an indication of the position of the microcoil together in the magnetic resonance image, ~~and~~

deriving a correct position of the detail of the object being examined in the magnetic resonance image relative to the indication of the position of the microcoil on the basis of the position of the indication of the position of the microcoil and the determined geometrical relationship between the position of the microcoil and the object being examined,

determining a temperature dependant chemical shift upon comparison of the measuring magnetic resonance signals to the reference magnetic resonance signals, and

Appln. No. 09/857,310
Amdt. dated December 10, 2003
Reply to Office Action dated Oct. 27, 2003

determining a local variation in temperature on the basis of
the temperature dependent chemical shift.

2. (Cancelled)

3. (Currently Amended). A method of forming a magnetic resonance image as claimed in Claim 1 further comprising the ~~steps~~ step of:

~~acquiring a set of measuring magnetic resonance signals
at a reference temperature, acquiring a set of measuring magnetic
resonance signals after the temperature has been changed, notably
increased, at the area of the microcoil, deriving reference
magnetic resonance image from the reference magnetic resonance
signals, deriving a measuring magnetic resonance image from the
measuring magnetic resonance signals, and~~

making the measuring magnetic resonance image and the
reference magnetic resonance image ~~to~~ register on the basis of
the determined position of the microcoil.

4. (Previously Presented). A method of forming a magnetic resonance image as claimed in Claim 3 further comprising the step

Appln. No. 09/857,310
Amdt. dated December 10, 2003
Reply to Office Action dated Oct. 27, 2003

of:

on the basis of the determined position of the microcoil, acquiring the reference magnetic resonance signals and the measuring magnetic resonance signals from essentially the same region.

5. (Previously Presented). A method of forming a magnetic resonance image as claimed in Claim 3 further comprising the steps of:

reproducing a detail and an indication of the position of the microcoil in the reference magnetic resonance image,

reproducing the same detail and the indication of the position of the microcoil in the measuring magnetic resonance image, and wherein

a shift of the detail is derived from respective positions of the detail relative to the indication of the position of the microcoil in the reference magnetic resonance image and the measuring magnetic resonance image, correcting the position of the detail in the measuring magnetic resonance image is corrected on the basis of the derived shift of the detail.

Appln. No. 09/857,310
Amdt. dated December 10, 2003
Reply to Office Action dated Oct. 27, 2003

6-8. (Cancelled)

9. (Previously Presented). A method as claimed in Claim 1 wherein the step of determining the position of the microcoil comprises the steps of:

positioning the microcoil at a measuring site such that position magnetic resonance signals are produced by the microcoil, and

deriving the position of the microcoil from the position magnetic resonance signals.

10-18. (Canceled)

19. (Currently Amended) A method of forming a magnetic resonance image as claimed in Claim [[18]] 1, wherein an indication of the position of the ~~measuring site~~ microcoil is reproduced in the reference magnetic resonance image and in the measuring magnetic resonance image.

20. (Currently Amended) A method of forming a magnetic resonance image as claimed in Claim [[18]] 1, further comprising

Appln. No. 09/857,310
Amdt. dated December 10, 2003
Reply to Office Action dated Oct. 27, 2003

the step of:

using an energy-dissipating element in conjunction with the microcoil to provide for the increase in temperature in the area proximate the microcoil.

21. (Currently Amended) A method of forming a magnetic resonance image as claimed in Claim [18] 1, further comprising the step of:

arranging an energy-dissipating element near the microcoil to provide for the increase in temperature in the area proximate the microcoil.

22. (Currently Amended) A method of forming a magnetic resonance image as claimed in Claim [18] 1, further comprising the steps of:

inserting an additional microcoil into the object being examined, and

measuring the position and direction of a line through the microcoils.

23. (Currently Amended) A method of forming a magnetic

Appln. No. 09/857,310
Amdt. dated December 10, 2003
Reply to Office Action dated Oct. 27, 2003

resonance image as claimed in Claim [[18]] 1, further comprising the steps of:

inserting two additional microcoils into the object being examined such that all three microcoils are not on the same line, and

measuring the position and orientation of a plane through the microcoils.

24. (Previously Presented) A method of forming a magnetic resonance image as claimed in Claim 1, further comprising the steps of:

mounting the microcoil on an interventional instrument.

25. (Previously Presented) A method of forming a magnetic resonance image as claimed in Claim 1, further comprising the step of:

mounting the microcoil on a catheter.

26. (Previously Presented) A method of forming a magnetic resonance image as claimed in Claim 1, wherein the geometrical relationship between the position of the microcoil and the object

Appln. No. 09/857,310
Amdt. dated December 10, 2003
Reply to Office Action dated Oct. 27, 2003

being examined is determined such that upon movement of the object being examined, an adjusted position of the microcoil is determinable.

27. (Canceled)

28. (Canceled)